Mountain Goat

IN BRITISH COLUMBIA

Ecology, Conservation and Management

BRITISH COLUMBIA
Ministry of Environment, Lands and Parks

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No other hoofed mammal on the continent, and few outside it, are so superbly adapted to steep terrain and severe winters.

INTRODUCTION

The shaggy white Mountain Goat *(Oreamnos americanus)* is in many respects a peculiar beast. This muscular, plodding mountaineer is a product of the Pleistocene ice age whose snowy colour makes it well-adapted for escaping detection in wintry landscapes. No other hoofed mammal in North America, and few outside it, are so superbly adapted to steep terrain and severe winters. Though often called a "goat-antelope," it is neither. It has no close relatives in North America, and its closest kin in Europe and Asia are not very similar. British Columbia is the heartland of Mountain Goats and contains more than half of the world's population. But because of its lofty, remote haunts, it is the least familiar of our hoofed mammals (ungulates).

TAXONOMY

Order
Artiodactyla
(Even-toed ungulates)

Family
Bovidae
(Bison, Mountain Goat, Bighorn Sheep, Thinhorn Sheep)

Genus
Oreamnos

Species
americanus
(Mountain Goat)

EVOLUTION AND APPEARANCE

The closest old world relatives of the Mountain Goat – the Chamois, Goral and Serow – are not particularly similar to it and provide few clues to its origins. The main likeness is their relatively short, thin, sharply pointed horns, which are permanent and almost the same in both sexes. But there the similarities end. The lineage of the Mountain Goat is obscure, mostly because glaciation and erosion in steep mountains have destroyed any previously existing goat fossils. An ancestor of the goat must have crossed the Bering land bridge between Siberia and Alaska before the most recent (Wisconsin) glaciation because *Oreamnos* fossils up to 100,000 years old have been found south of the glacial limit in the United States. Until about 12,000 years ago, two species of Mountain Goat were present in the southwest United States, *O. americanus* and the smaller *O. harringtoni*. As the last Cordilleran ice sheet waned, Harington's Goat became extinct and *O. americanus* moved north to the snowy mountains it favours. The universally white colour of the Mountain Goats suggests that the species evolved for thousands of years in close association with snow and ice.

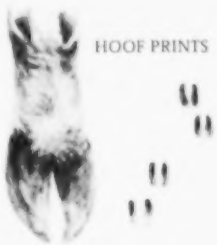
Mountain Goats have the thickest and longest pelage of any North American ungulate except the Musk Oxen.

Adult males (billies) weigh on average 70 to 120 kg, adult females (nannies) 55 to 75 kg. Both sexes have thin, black stiletto-like horns up to 30 cm long. These grow throughout life and are never shed. Growth rings on the horns (annuli) indicate age. Male and female goats look similar, but the horns are slightly different. Nannies' horns are more slender at the base and a bit more curved toward the tip than those of billies. Behaviour can also provide a good clue to gender. Lone adults and those in groups of two or three with

L. Tooze

no accompanying kids or yearlings are usually billies; if the social group contains kids, the adults are almost certainly nannies, unless it's the mating season.

The Mountain Goat is built to live in steep, rocky terrain. Its forequarters are disproportionately massive in relation to its compact rear end. Its deep chest and tremendously developed shoulder muscles give the Mountain Goat great strength for climbing and for pawing through snow for food. Because it has relatively short legs that are close together, and a centre of gravity that is close to the ground and well forward, it can travel on narrow ledges with limited footing. The goat's cloven hooves have rough-textured traction pads that project slightly past the rim of the hooves and make them highly specialized for rocky, slippery terrain. Also, its toes can spread widely to distribute its weight over more ground and close pincer-like around rocky projections to provide extra traction on downhill slopes.


HOOF PRINTS

Mountain Goats have the thickest and longest pelage of any North American ungulate except the Musk Oxen. The goat's bearded chin and the long hair of its upper legs, which looks like pantaloons, add to the goat's distinctive appearance. Its winter coat consists of coarse hollow guard hairs up to 20 cm long and very fine, interwoven underfur that is 5 to 8 cm long. This enables goats to withstand the most severe wind chill. Billies shed their winter coat by early July and nannies somewhat later. Even the summer coat is warm, however, and the goats seek out cool, shady spots in hot weather. Heat stress may determine the southern limit of the Mountain Goat's distribution.

DISTRIBUTION AND ABUNDANCE

In British Columbia, goats are present in most mountain ranges except for those on Vancouver Island, the Queen Charlottes, and other coastal islands. They exhibit a wide tolerance for climatic conditions, from tidewater along coastal inlets to the Continental Divide and from the arid Similkameen valley to the Yukon border. Though mostly confined to prominent mountain ranges, some Mountain Goats occur along river canyons cut through plateaus – for example, the Stikine Canyon.

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According to recent estimates, the number of Mountain Goats in North America has varied from about 75,000 to 100,000. This number includes 14,000 to 15,000 in the western states, 10,000 to 25,000 in Alaska, about 50,000 in British Columbia, and small numbers in Alberta, Yukon, and Mackenzie Territory. During the 1900s, and particularly from 1950 to 1975, goat numbers declined in many areas, primarily because of over-hunting. Recent hunting restrictions and reintroductions have largely reversed that trend. In British Columbia, goats are more numerous in the northwest part of the province, but substantial populations occur throughout the main chain of the Rockies and in the Coast, Cariboo, Selkirk and Purcell ranges.

LIFE HISTORY

Mountain Goat society consists of relatively small bands that change in composition frequently. These bands interact daily, often antagonistically. Except during the mating season, nannies live apart from the billies with their kids and yearlings, but often not far away. Nannie groups, also called nursery bands, usually average about four or five, but many increase to 15 to 20 or more after kidding. Billies often live alone or in groups of two to four. Both groups have a well-developed dominance hierarchy or pecking order based on size, strength, and experience. Goats are not territorial in the sense of defending an exclusive piece of habitat, but they defend a small personal space around them

Most females breed for the first time when they are two years old. Males are physiologically capable of

Billies always behave submissively toward nannies out of respect for their dagger-like horns.

mating at that age, too, but older, dominant billies do most of the most successful breeding. The mating season, or rut, peaks in late November and early December. In the weeks leading up to it, the billies stop eating, engage more often in ritualized threats, dig urine pits where they wallow and soil their coats, and follow adult nannies (at a safe distance). Billies always behave submissively toward nannies out of respect for their dagger-like horns. Only during estrus (heat) will the nannie allow billies to approach closely and to engage in the ritualized low-stretches, lip curls, nuzzling, and kicks that precede actual mating.

After a gestation period of six months, nannies retire to secluded, precipitous ledges to give birth to their 3 kg kids in late May or early June. A single birth is the rule, and up to 40 percent of mature nannies may not produce any offspring. Twins are rare. Goat kids start to climb within a few hours and follow their mothers across broken terrain within four or five days. They suckle often in the first few days but soon begin to graze on tender plants. After four months, they nurse infrequently. Goat mothers are exceedingly attentive, and the mother-infant bond is strong until the next kid is born.

Mountain Goats keep growing in size until they are about four years old and seldom live longer than 12 years. Forty to sixty percent of kids die in their first winter, and many yearlings also die in their second winter, probably from starvation. Accidental losses from falls and avalanches are more significant for goats than for other ungulates, but they are not a major limiting factor. Predators like wolves and Cougars occasionally ambush an unwary stray goat, and eagles knock a few kids from cliffs. But because of their alertness, preference for steep terrain, and ability to use their horns against would-be attackers, goats are less susceptible to predation than most big game animals. Mortality rates are highest in severe winters, occasionally over 50 percent; therefore it seems likely that unusually deep and persistent snow, which covers forage, saps energy reserves, and delays spring green-up is the major reason some goats don't survive.

KIDS ARE PRECOCIOUS AND FOLLOW THEIR MOTHER SHORTLY AFTER BIRTH.
David F. Fraser

ECOLOGICAL RELATIONSHIPS

In British Columbia, Mountain Goats occur in both wet and dry regions and at various elevations, but the terrain is always steep. Coastal and interior goats usually remain at low elevations in spring in order to take advantage of the earliest flush of green vegetation. As spring progresses into summer, they follow the development of new growth upward, taking advantage of its most nutritious early stages. In summer and early fall, most goats graze at and above the timberline, where they favour lush alpine swales and boulder meadows beside steep cliffs. Some may migrate a few kilometres between winter-spring and summer ranges, but many seasonal migrations are just local shifts in elevation.

Most winter ranges are steep sites which shed snow and have a south to west exposure which favours solar warming.

Most winter ranges are steep sites that shed snow and have a warm south to west exposure. Along the coast, winter ranges are invariably at low elevations because at high elevations, the deep, heavy snow is not readily blown away to expose forage and because near sea level, snow is much shallower in depth or even absent. Goats often winter on cliffs that rise directly from the beach. In the interior, where snow is usually shallower and drier and high winds are frequent, goats winter on cliffs at varying elevations, including high windswept ridge crests. In mid- to late winter the snow at high elevations often develops a firm crust because of strong winds and cycles of thawing and freezing. This allows the goats to walk on top of the snow and travel more widely in search of food.

Goats can't afford to be choosy about what they eat because their foraging sites tend to be widely dispersed, small in size, and sparsely vegetated. They survive by eating a wide variety of plants, including lichens, ferns, grasses, herbs, shrubs, and deciduous or coniferous trees. No other hoofed animal in North America is so versatile. Goat diets vary considerably from place to place; in dry regions, they eat mostly grasses and in wet areas, woody browse. Their food

habits also change with the seasons. Herbaceous material are prominent in the late spring and summer diet; in winter, they eat woody twigs and lichens.

Mountain Goats are strongly attracted to mineral licks in summer, especially interior herds. They often travel several kilometres downslope through forest to reach them. Many licks are on cliffs along incised river valleys, but some are simple clay pits where the goats may linger for up to three weeks, apparently to satisfy their craving for sodium and other minerals that are in short supply in lush spring vegetation.

The Mountain Goat has successfully adapted to a narrow, extreme niche where it can avoid competition from other herbivores and predation by large carnivores. Goats share their lofty haunts amicably with a few non-threatening alpine specialists like marmots, pikas, and ground squirrels, but few predators can negotiate goat terrain. However, Golden Eagles, which nest on high mountain cliffs, are a constant threat. The specialized rocky niche of goats also prevents serious competition from livestock and wild ungulates. Elk, deer, Caribou, and Mountain Sheep sometimes graze with goats on alpine-subalpine meadows near cliffs, but they don't normally affect the goats' food supply. Goats frequently encounter other hoofed animals at salt licks, where they often chase deer away but may be displaced themselves by Elk.

VALUES AND USES

First Nations people, especially on the coast, have made use of goat products for eons. They ate goat meat, made ceremonial spoons and other implements from the horns, and wove blankets and rugs from the fur. Some coastal people still do this kind of weaving. Interior tribes reputedly fashioned the incredibly thick hide of the goat's flank into armour for deflecting arrows. Even though native people hunted Mountain Goats, goats were apparently abundant when the first Europeans arrived.

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Sport hunters prize Mountain Goats, and today, limited sport hunting provides much-needed revenue to government for enforcement and habitat enhancement programs as well as employment for guide-outfitter operations in remote areas.

MOUNTAIN GOATS OCCUPY THE MOST RUGGED AND REMOTE HABITATS OF ALL NORTH AMERICAN UNGULATES. *K. Brunt*

Although public access to goat country is not easy, people who can get there can see them fairly easily because of their white colour and their preference for largely treeless terrain. The viewing of goats undoubtedly contributes to British Columbia's ecotourism industry and its reputation for wilderness. Certain populations are already managed for viewing, for example along the Similkameen valley between Hedley and Keremeos, where goats are visible from the highway in winter and spring. Goats are most visible in spring (April to June) when they are at low elevations, but even then, binoculars or a telescope is advisable. Likely locations include the Duffy Lake Road-Seton Lake area, Robson Ridge beside lower Arrow Lake, Mount Broadwood near Elko, along highways through Kootenay National Park and Mount Robson Provincial Park, and the north side of the lower Skeena River valley. People on summer packhorse or hiking trips into remote alpine areas in Cathedral, Ts'y-los, Wells Gray, or Mount Assiniboine provincial parks are likely to see goats in spectacular alpine settings.

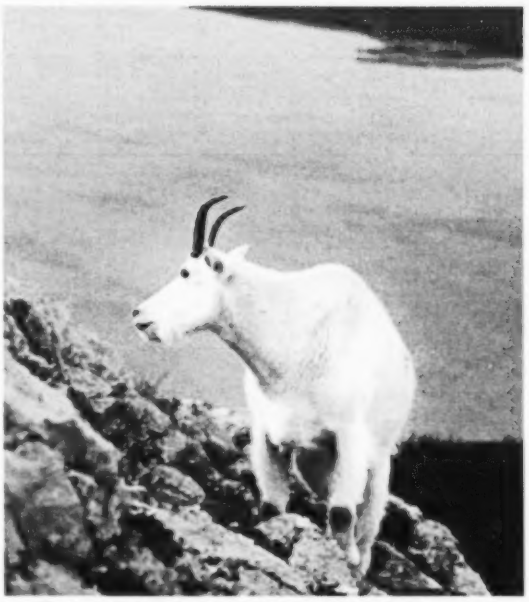
CONSERVATION

Because Mountain Goats are widespread, numerous, and stable in most areas of the province, they are not considered at risk and have been included in the 1998 Yellow List by the BC Conservation Data Centre.

Their security is partly due to their preference for rugged, remote habitats. This has shielded them from developments that have harmed many other wildlife species – land settlement, competition from livestock, highways, logging, and hydroelectric reservoirs. Mining disturbance has had an effect on localized sites, and logging can affect coastal Mountain Goat winter ranges as well as the fringes of interior goat winter ranges and low-elevation licks. In general, the places goats choose are not in high demand for other uses. However, unintended harassment of goats by helicopters has been a concern, particularly during the kidding season and in winter when the animals are in the poorest condition. Snowmobiles are also a concern in some areas. Changing travel routes and careful scheduling of disturbing activities can resolve these problems.

Between 1950 and 1975, hunting seriously reduced some British Columbia goat populations. This was a period of great expansion of logging, mining, and other access roads that vastly improved access for hunters (and poachers) to remote valleys. During that era, an increase in the number of hunters and the introduction of liberal hunting regulations resulted in declines in the number of goats in the lower mainland, the east Kootenay, and the south Peace regions and a few other locations. Sport hunting for goats is more difficult to manage than hunting for most other big game species because goats are visible, unwary, and vulnerable when in cliffy terrain. Goats have a low reproductive rate and do not readily repopulate ranges after they have been removed. Also, because all adult goats have similar sized horns, the establishment of male-only hunting seasons is impractical. Recognizing these difficulties, the Wildlife Branch has instituted closed seasons, limited entry hunting, guide quotas, improved inventory programs, and more rigorous enforcement of regulations. More conservative management programs in the 1980s and 1990s have stemmed the earlier declines and resulted in herd increases in some areas.

Some goat populations depend on winter ranges where wildfires create early seral vegetation. In recent years, forest fire control has made many of those habitats less productive for goats. Allowing some wildfires to run their course and enhancing goat range through prescribed burning would help the recovery of goat populations. Future needs also include regular monitoring of goat numbers, careful control of hunting and poaching, continued protection of habitat, and possibly some reintroduction of goats into previously occupied ranges. In addition, controlling of helicopter flights, motor vehicle access, snowmobiles, and human recreational activities may be necessary in some locations. These measures, and a little respect, should ensure the future of the Mountain Goat, surely one of British Columbia's most unusual mammals.



THE SECURITY OF MOUNTAIN GOATS IN BC IS PARTLY DUE TO THEIR PREFERENCE FOR RUGGED, REMOTE HABITATS.
Leah R. Ramsay

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PROJECT COORDINATION: IAN HATTER, GAIL HARCOMBE, LIZ STANLAKE, ARLENE BETHUNE
ORIGINAL TEXT: DONALD A. BLOOD
ARTWORK: MICHAEL HAMES
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